

Cancel claims 4-8, 29-30

REMARKS

The Examiner has subjected this application to restriction under 35 U.S.C. 121. The Examiner has formed two groups of claims, Group I directed to claims 1-26 and 35-42 and drawn to a method, and Group II directed to claims 27-34 and drawn to a product. The Examiner has asserted that these groups of claims represent distinct inventions and may properly be restricted. Applicants hereby confirm their provisional election of Group II, directed to claims 27-34 for examination. However, the restriction requirement is traversed. It should be noted, the Commissioner may statutorily require the election of inventions "If two or more independent and distinct inventions are claimed in one application." In the instant case the Examiner is alleging that the inventions of groups one and two are distinct, although absolutely no showing of such distinctness has been made.

The Examiner's attention is directed to 37 C.F.R. 1.141(b) where allegedly different classes of inventions may be included and examined in a single application provided they are so linked as to form a single inventive concept. Please note that claims for a product are specifically authorized for examination together with claims for one process specially adapted for the use of that product. This is exactly the type of case for which the rule was promulgated, i.e., to avoid burdensome and unnecessary restrictions. It is also asserted that the requirement to restrict the present application would be an unnecessary burden upon the Applicants and the Examiner's failure to follow the mandates of the statute and regulation would be a denial of due process. For these reasons it is respectfully urged that the restriction requirement should be rescinded and that the method claims should be rejoined.

The examiner has rejected claims 27, 29-34 under 35 U.S.C. 102 over Takeuchi et al. Applicants respectfully assert that this ground of rejection has been overcome by the instant amendment. The invention relates to a flexible printed circuit board having

improved interlayer adhesion and excellent thermal performance. The invention now claims a printed circuit board composite which includes a polyimide substrate having a first etched surface, a first polyimide film attached to the first etched surface, and a layer of a metal foil attached to an opposite side of the first polymeric film, and wherein the resulting printed circuit board has a peel strength of at least 4 lbs./inch.

Indeed, Takeuchi et al. teaches an adhesive sheet which includes a polyimide substrate which is subjected to a surface modification treatment such as plasma treatment; an adhesive layer attached to the polyimide substrate; and a copper foil attached to the other side of the adhesive layer. However, Applicants respectfully point out that the adhesive layer of Takeuchi et al. does not comprise a polyimide, but rather it comprises a *siloxane-modified polyamideimide resin composition*. It is not a polyimide layer as is required by the amended claims.

It is urged that Takeuchi et al. teaches the formation of a different end product from the present invention, using different components than are taught by the present invention. Thus, it is submitted that the present invention is patentably distinct from Takeuchi et al. It is therefore respectfully urged that the 35 U.S.C. 102 rejection is improper and should be withdrawn.

The examiner has rejected claims 27-34 under 35 U.S.C. 102 over Viehbeck et al. Applicants respectfully assert that this ground of rejection has been overcome by the instant amendment.

Viehbeck et al. relates to a method for conditioning certain organic polymeric materials in order to bond surfaces of the polymeric material together. In particular, it describes a method by which electrons are supplied to redox sites of the polymeric material either by means of a cathode in an electrochemical circuit; or by means of a reducing agent in solution; or by contacting the polymeric material with tetrakis(dimethylamino)ethylene. In addition, they do not coat an polyimide solution onto a copper foil. Rather they seed a polyimide surface with a metal salt which forms a thin metal layer and then they plate on

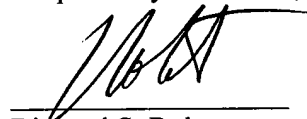
that seed formed layer. In effect they grow copper on a polyimide substrate rather than coating a polyimide solution onto a foil.

Applicants respectfully submit that Viehbeck et al. fails to teach every aspect of the claimed invention. The present invention now claims a printed circuit board composite which has a peel strength between layers which is at least 4 lbs./inch. In contrast, Viehlbeck, et al produces a product having a much lower peel strength. As can be seen on column 19, lines 35 to 37, the peel strength is no more than 52 g/mm or 2.9 lbs./inch.

It is submitted that these features of the present invention renders the invention patentably distinct from Viehbeck et al. It is therefore respectfully urged that the 35 U.S.C. 102 rejection has been overcome.

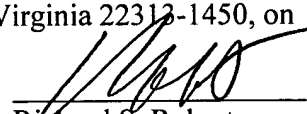
The undersigned respectfully requests re-examination of this application and believes it is now in condition for allowance. Such action is requested. If the examiner believes there is any matter which prevents allowance of the present application, it is requested that the undersigned be contacted to arrange for an interview which may expedite prosecution.

Respectfully submitted,



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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail, postage pre-paid in an envelope addressed to Commissioner for Patents, P.O. 1450, Alexandria, Virginia 22312-1450, on May 28, 2003.



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APPENDIX

MARKED-UP COPY OF AMENDED CLAIMS

1. (Amended) A process for forming a printed circuit board composite comprising:
 - a) etching at least one surface of a polyimide [polymeric] substrate;
 - b) coating a first polyimide [polymeric] film onto a surface of a metal foil; and
 - c) laminating the first polyimide [polymeric] film onto the substrate by:
 - i.) laminating the first polyimide [polymeric] film directly onto at least one etched surface of the substrate, or
 - ii.) laminating the first polyimide [polymeric] film onto at least one etched surface of the substrate via an intermediate second polymeric film; and

wherein the resulting printed circuit board composite has a peel strength of at least 4 lbs./inch.
2. (Amended) The process of claim 1 wherein the first polyimide [polymeric] film is laminated directly onto at least one etched surface of the substrate.
3. (Amended) The process of claim 1 wherein the first polyimide [polymeric] film is laminated onto at least one etched surface of the substrate via an intermediate second polymeric film.
11. (Amended) The process of claim 1 wherein the first polyimide [polymeric] film has a thickness of about 3 μm to about 50 μm .
23. (Amended) The process of claim 22 further comprising:
 - i.) laminating an additional first polyimide [polymeric] film coated on a surface of an additional metal foil directly onto the second etched surface of the substrate, or
 - ii.) laminating an additional first polyimide [polymeric] film coated on a surface of an additional metal foil onto the second etched surface of the substrate via an intermediate second polymeric film.

24. (Amended) The process of claim 23 wherein the additional first polyimide [polymeric] film is laminated directly onto the second etched surface of the substrate.

25. (Amended) The process of claim 23 wherein the additional first polyimide [polymeric] film is laminated onto the second etched surface of the substrate via an intermediate second polymeric film.

27. (Amended) A printed circuit board composite comprising a polyimide [polymeric] substrate having a first etched surface, a first polyimide [polymeric] film attached to the first etched surface of the substrate and a layer of a metal foil attached to an opposite side of the first polyimide [polymeric] film; and wherein the resulting printed circuit board composite has a peel strength of at least 4 lbs./inch.

28. (Amended) The printed circuit board composite of claim 27 wherein the substrate further comprises a second etched surface opposite the first etched surface, an additional first polyimide [polymeric] film attached to the second etched surface and an additional layer of a metal foil attached to an opposite side of the additional first polyimide [polymeric] film.

35. (Amended) A process for forming a printed circuit board comprising:

- a) etching at least one surface of a polyimide [polymeric] substrate;
- b) coating a first polyimide [polymeric] film onto a surface of a metal foil;
- c) laminating the first polyimide [polymeric] film onto the substrate by:
 - i.) laminating the first polyimide [polymeric] film directly onto at least one etched surface of the substrate, or
 - ii.) laminating the first polyimide [polymeric] film onto at least one etched surface of the substrate via an intermediate second polymeric film;
- d) depositing a photoresist onto the metal foil;
- e) imagewise exposing and developing the photoresist, thereby revealing underlying portions of the metal foil; and

f) removing the revealed underlying portions of the metal foil; and
wherein the resulting printed circuit board has a peel strength of at least 4 lbs./inch.

43. (New) The process of claim 1 wherein the polyimide film is applied to the metal foil by coating a solvent solution of the polyimide onto the foil and drying wherein the solution has a viscosity ranging from about 5,000 to about 35,000 centipoise.

44. (New) The printed circuit board composite of claim 27 wherein the polyimide film has been applied to the metal foil by coating a solvent solution of the polyimide onto the foil and drying wherein the solution has a viscosity ranging from about 5,000 to about 35,000 centipoise.

45. (New) The process of claim 35 wherein the polyimide film is applied to the metal foil by coating a solvent solution of the polyimide onto the foil and drying wherein the solution has a viscosity ranging from about 5,000 to about 35,000 centipoise.

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